

Implementation of Qualitative Unrelated Question Model for Obtaining Sensitive Information at On-Line Survey

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Abstract

This paper is planned to use randomized response technique which is an indirect response technique on internet as a way of obtaining much more precise information, not revealing secrets of responders, considering that respondents are generally reluctant to answer in a survey to get sensitive information targeting employees, customers, etc.

Keywords : , , E-R diagram

1.

(off-line)

가 (,)

()

가 가

Warner(1965)

response technique ; RRT)

. Warner

(randomized

. Greenberg (1969)

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(unrelated question technique) , Greenberg (1971)
 . Loynes(1976)

Warner “ ”
 (forced answer technique) . , , ,
 , 가 가 . Fox
 Tracy(1986), Chaudhuri Mukerjee(1988) , .
 , , , .
 (1993) ,
 (1995)
 . (2001)
 .
 .
 (log in) IP (spot survey)가 가
 ,
 IP가 (Mac Address)
 ,
 2 , 3
 , 4 , 5
 .
 2.
 (qualitative unrelated question technique)
 2가
 가 .
 가 (. Greenberg
 Y) , Moors(1971)
 (1969)
 Lanke(1975) .

“ Y” (π_y)
 (π_y) 2 “ Y”
 (π_y) Greenberg (1969)
 2
 1 : A 가 ?
 2 : Y 가 ?
 “ ” n “ ”
 “ ” 1 p, 2가 1 - p
 “ ”

$$\lambda = p\pi + (1 - p)\pi_y \quad (2.1)$$

π A , π_y Y
 n “ ” n₁ $\hat{\lambda} = \frac{n_1}{n}$
 A π

$$\hat{\pi} = \frac{\hat{\lambda} - (1 - p)\pi_y}{p} \quad (2.2)$$

$$Var(\hat{\pi}) = \frac{\lambda(1 - \lambda)}{np^2} \quad (2.3)$$

, $\hat{\pi}$
 $\widehat{Var}(\hat{\pi}) = \frac{\hat{\lambda}(1 - \hat{\lambda})}{(n - 1)p^2}$, (n ≠ 1, p ≠ 0) (2.4)

Y (π_y) 가
 “ Y” (π_y)
 π_y
 가 π π
 π_y
 가 n₁ n₂ π
 i (i = 1, 2) p_i가
 가 . i “ ”

$$\lambda_i = p_i(\pi - \pi_y) + \pi_y \tag{2.5}$$

π A π_y Y .
 n_{i1} i " " $\hat{\lambda}_i = n_{i1}/n_i$
 A π .

$$\hat{\pi}_{u2} = \frac{\hat{\lambda}_1(1 - p_2) - \hat{\lambda}_2(1 - p_1)}{p_1 - p_2}, p_1 \neq p_2 \tag{2.2}$$

$$Var(\hat{\pi}_{u2}) = \frac{\frac{(1 - p_2)^2 \lambda_1 (1 - \lambda_1)}{n_1 - 1} + \frac{(1 - p_1)^2 \lambda_2 (1 - \lambda_2)}{n_2 - 1}}{(p_1 - p_2)^2}, p_1 \neq p_2 \tag{2.3}$$

, $\hat{\pi}_{u2}$

$$\widehat{Var}(\hat{\pi}_{u2}) = \frac{\frac{(1 - p_2)^2 \hat{\lambda}_1 (1 - \hat{\lambda}_1)}{n_1 - 1} + \frac{(1 - p_1)^2 \hat{\lambda}_2 (1 - \hat{\lambda}_2)}{n_2 - 1}}{(p_1 - p_2)^2}, p_1 \neq p_2 \tag{2.8}$$

3.

Linux , gnu c compiler, Java, html ,
 MySQL-Ver 3.23.39 . ()
 가 .

가

 1 2 .
 () ()
 () () ,
 () .

(query)

가

< 3.1> < 3.4>

< 3.1>

Logical Name	Physical Name	Data Type	
	idx	integer	pk, auto_increment
	day	date	
	time	time	
	subject	varchar(79)	
	number	tinyint	
	check	char(2)	
	title	blob	

< 3.1>

< 3.2>

가

< 3.2>

Logical Name	Physical Name	Data Type	
	idx	integer	pk, auto_increment
1	q1	varchar(79)	
2	q2	varchar(79)	
	mode	varchar(2)	
	type	varchar(2)	
1 1	p1	float	
2 1	p2	float	
	p3	float	
1	n1	smallint	
2	n2	smallint	

< 3.3> < 3.4>

가 2

가 n_1, n_2

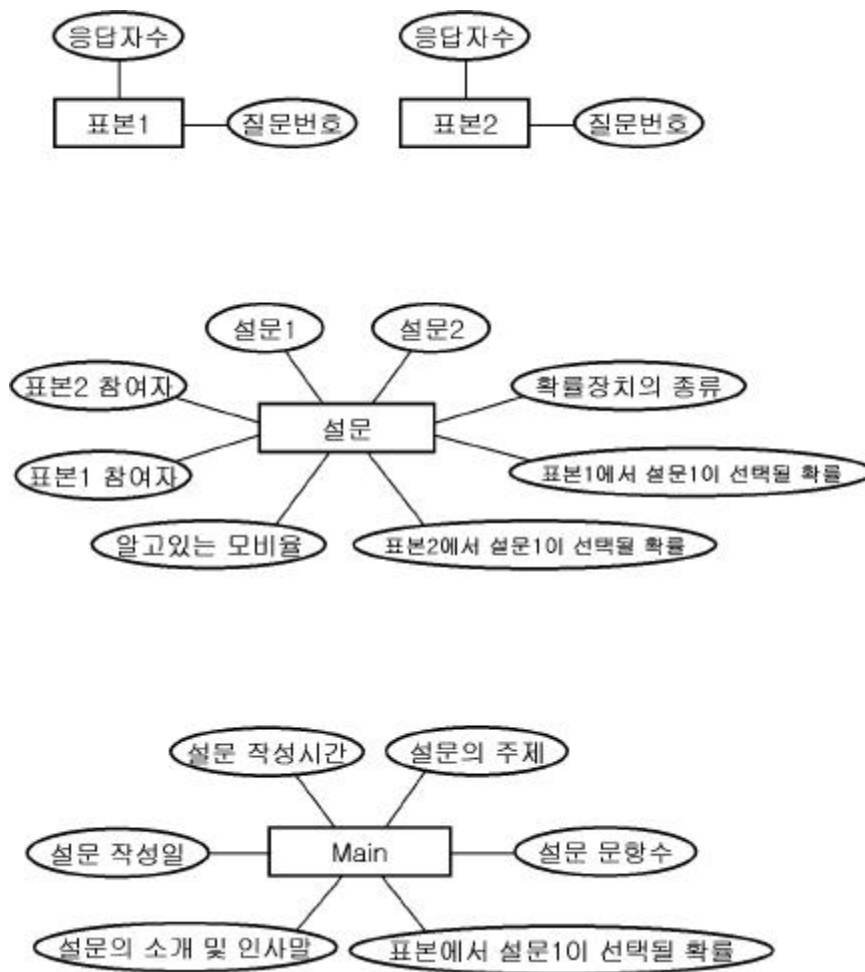
< 3.3> 1

Logical Name	Physical Name	Data Type	
	idx	integer	pk, auto_increment
“ ”	s1	mediumint	

< 3.4> 2

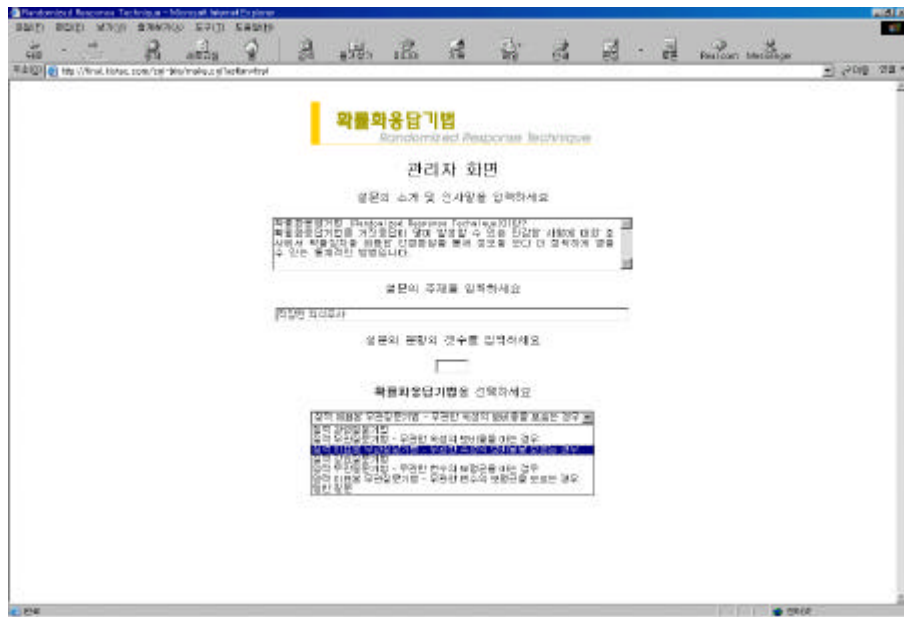
Logical Name	Physical Name	Data Type	
	idx	integer	pk, auto_increment
“ ”	s1	mediumint	

< 3.1> 가
가

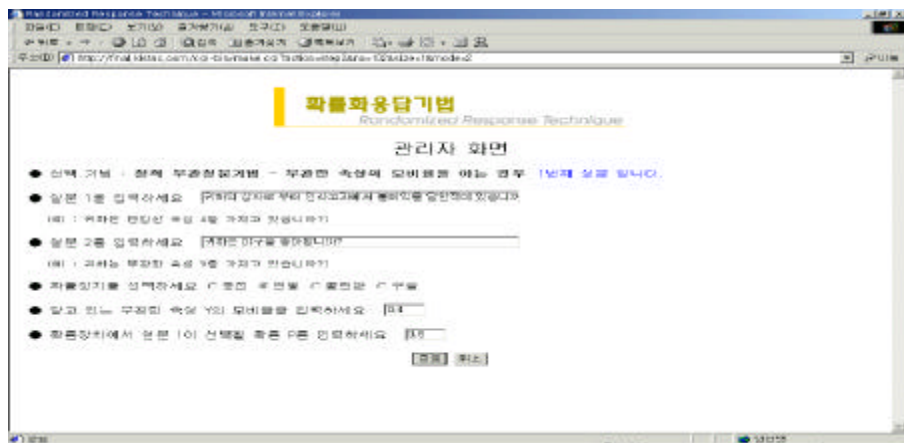


< 3.1> E-R Diagram

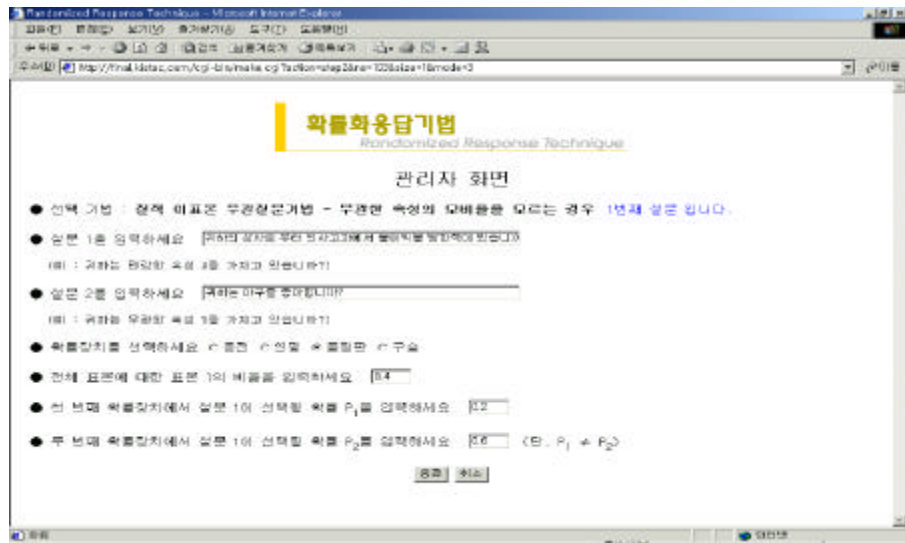
3.2> ,
 , < 3.3> <
 3.4> 가 ,



< 3.2>



< 3.3>



< 3.4>

4

, < 3.5>

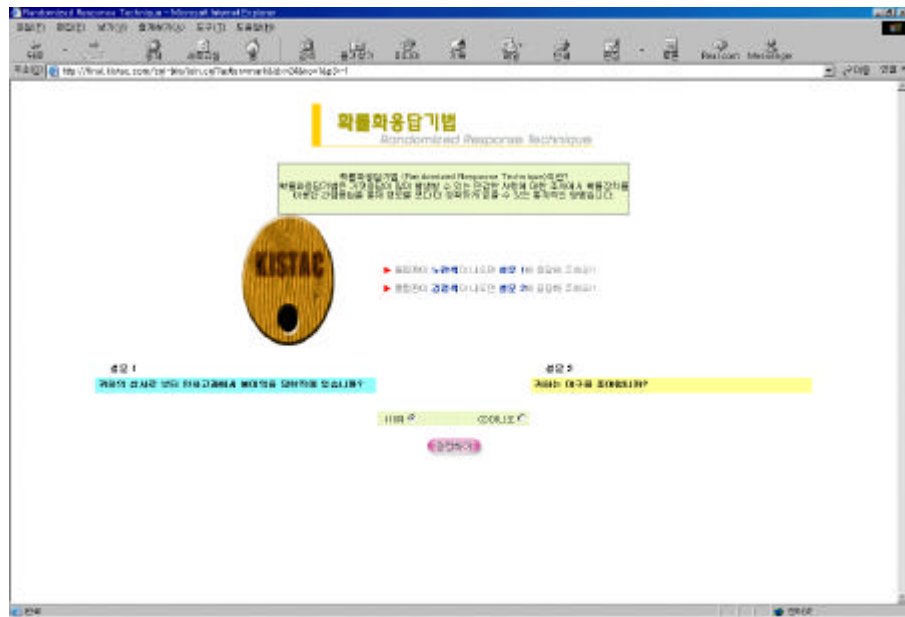
4가

1



< 3.5> 4

< 3.6>



< 3.6>

가 1 “ ” 2 “ ”
가 .

4.

: 2002. 1.4 ~ 1.31

: ()Esab (150)

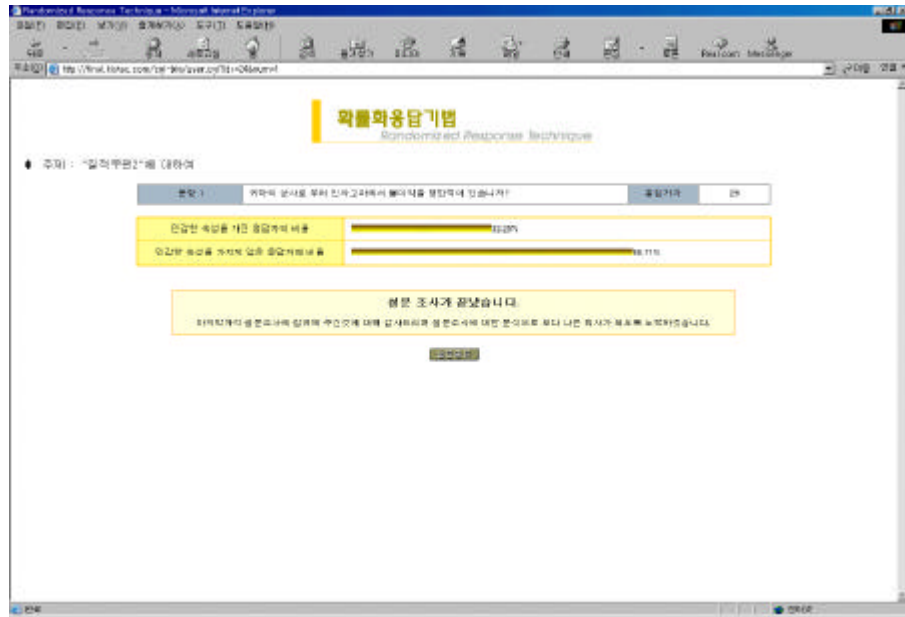
: ?

, A

< 4.1>

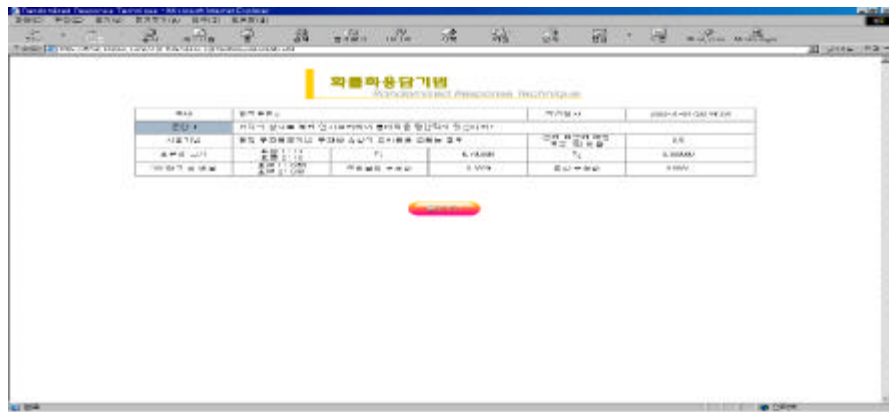
< 4.1> “ ” “

29 π $\hat{\pi}$ 0.3329 .



< 4.1>

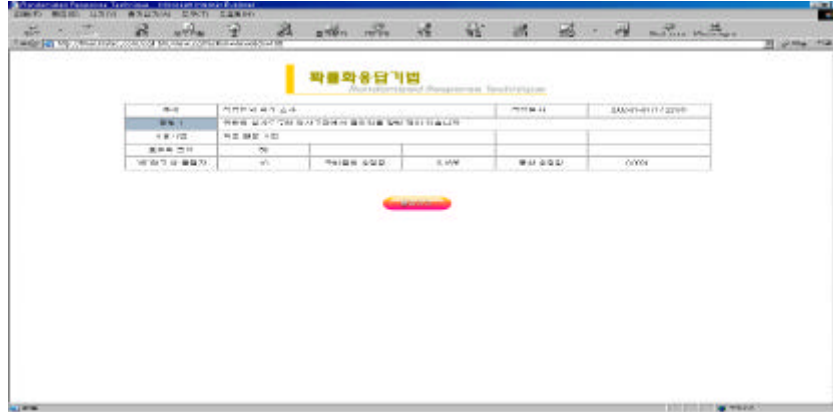
< 4.2> . 1
 , 1 , 2 , 1 p_2 , 1 “ ” ,
 2 “ ” , π $\hat{\pi}$ $\hat{\pi}$



< 4.2>

“ ”

< 4.3>



< 4.3>

29, “ ”

20,

33.29%, 0.0691.

59, “ ” 10,

16.95%

, 0.0024.

가

5.

가

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